



HIV and Your Whole Health

# HIV and Your Liver (Viral Hepatitis, Fatty Liver)

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The liver is one of the largest and most important organs in the human body. It processes almost everything you eat, drink, breathe and absorb through the skin. It breaks down harmful substances, such as alcohol, and it converts many drugs into forms that are easier for the body to use. It also provides energy from food, stores nutrients, produces blood proteins and acts as a filter to remove harmful toxins, microorganisms and waste products. A healthy liver is essential to a healthy life!

People with HIV often have problems that affect the liver. HIV can infect liver cells, and the virus can cause persistent inflammation—even when the viral load is undetectable—that can harm organs throughout the body.

Some medications can cause liver damage, including certain HIV meds. Alcohol, recreational or street drugs, some supplements and herbal remedies and toxic chemicals in the environment can also harm the liver.

Compared with HIV-negative individuals, people living with HIV are at higher risk for viral hepatitis (hepatitis A, B and C), alcoholic liver disease, and non-alcoholic fatty liver disease (NAFLD) and its more severe form, non-alcoholic steatohepatitis (NASH). Over time, hepatitis B or C, heavy alcohol use, fatty liver disease and other causes of liver damage can lead to cirrhosis, liver cancer and the need for a liver transplant.

Fortunately, there are many things you can do to keep your liver healthy, including eating a balanced diet, maintaining a healthy weight, getting enough exercise, limiting consumption of alcohol and recreational drugs, getting vaccinated against hepatitis A and B and getting treatment for hepatitis C.

Click on the links below for more information on each type of liver disease:

[Hepatitis A](#)

[Hepatitis B](#)

[Hepatitis C](#)

[Hepatitis D](#)

## Fatty Liver Disease

What are the signs of liver problems?

Regardless of the cause, liver conditions have many signs and symptoms in common, including:

- Feeling tired and rundown ([fatigue](#))
- Fever (with viral hepatitis)
- Loss of appetite
- Weight loss
- [Nausea](#)
- [Vomiting](#)
- Abdominal pain, especially in the upper right side
- Muscle and joint pain
- Itchiness (pruritus)
- Yellowing of the skin and whites of the eyes (jaundice)
- Dark urine
- Pale-colored stools.

Symptoms may occur during acute hepatitis, soon after infection with hepatitis A, B or C. But many people with early-stage liver problems have no symptoms and feel fine, or they may have mild symptoms that they mistake for the flu. Symptoms can worsen as liver damage progresses. However, many people with hepatitis B or C or fatty liver disease take years to develop symptoms, and some never do.

Changes in liver enzyme levels in the blood can be an early sign of trouble. These include ALT (alanine aminotransferase), AST (aspartate aminotransferase), alkaline phosphatase and bilirubin. Elevated ALT and AST are signs of liver inflammation. These liver function tests are usually included in standard “chem screens” that may be done when you have blood drawn to check your viral load and CD4 count.

What are the complications of liver damage?

Hepatitis B or C, fatty liver disease, heavy alcohol use, ongoing drug toxicity and other causes of liver injury can trigger liver inflammation. This can lead to the buildup of scar tissue, known as fibrosis, as the liver tries to repair itself. Over time—many years or even decades—this can progress to cirrhosis, hepatocellular carcinoma (the most common type of liver cancer), end-stage liver failure and the need for a liver transplant.

In people with early-stage cirrhosis, the liver still works relatively well. This is known as

compensated cirrhosis. Later, when the liver can no longer carry out its vital functions, they may progress to decompensated cirrhosis. People with advanced liver disease may experience a wide range of complications, including:

- Blockage of blood flow through the liver (portal hypertension)
- Abdominal bloating due to fluid accumulation (ascites)
- Swelling, especially in the legs and ankles
- Easy bleeding and bruising
- Blood vessels that resemble spider webs on the skin
- Enlarged blood vessels (varices) in the esophagus and stomach that can cause internal bleeding
- Brain damage leading to drowsiness and impaired mental function (hepatic encephalopathy).

Liver biopsies, imaging scans and blood tests are used to monitor liver disease progression. A biopsy involves inserting a hollow needle into the abdomen to take a small sample of liver tissue to examine under a microscope. A biopsy can show how much scar tissue or fat is present in the liver. Ultrasound scans are used to show liver fat accumulation, and a technique known as transient elastography (FibroScan) measures liver stiffness, which helps estimate the degree of fibrosis.

Several methods are used to classify liver damage. The METAVIR system ranks the level of inflammatory activity and fibrosis:

- Stage F0: no fibrosis
- Stage F1: mild fibrosis
- Stage F2: moderate fibrosis
- Stage F3: advanced fibrosis
- Stage F4: cirrhosis.

Child-Pugh-Turcotte and MELD (Model for End-Stage Liver Disease) scores are used to classify advanced liver disease, predict how long a patient is likely to live and prioritize people for liver transplants.

Can HIV drugs cause liver damage?

Like many medications, certain antiretroviral drugs can harm the liver, known as hepatotoxicity. Fortunately, modern antiretrovirals are generally much easier on the liver than older meds that are no longer widely used.

Liver damage is most likely to occur with drugs that are mainly processed by the liver (others are

mainly processed by the kidneys). Some meds can trigger a hypersensitivity or allergic reaction that can harm the liver. Older nucleoside reverse transcriptase inhibitors can damage the mitochondria, tiny structures inside cells that produce energy. This can lead to lactic acidosis, an elevated level of the cellular waste product lactate, which can lead to liver inflammation and fat buildup.

The risk of drug-related liver injury is greatest when drugs are taken at high doses or when multiple medications that affect the liver are taken together. In some cases, drugs can interact with each other in ways that lead to higher—and sometimes dangerous—levels in the body. People with preexisting liver disease (especially those with advanced cirrhosis), older individuals and people who drink heavily are more prone to drug-related liver problems.

At early stages, drug-related liver toxicity may have no symptoms. Measuring liver enzyme levels can help show whether drugs are causing liver damage. These tests are an important part of ongoing monitoring for people on antiretroviral treatment, especially after starting new meds. However, elevated liver enzymes are not specific to drug-related liver injury and are also seen in people with other liver conditions.

Drug-related liver damage usually comes on slowly, and regular monitoring can catch problems before they become serious. Such problems are often reversible when the offending drugs are stopped.

What liver diseases are common among people with HIV?

As antiretroviral treatment has extended the lives of people with HIV, liver disease has become a leading cause of illness and death in this population.

Hepatitis B and hepatitis C are transmitted in some of the same ways as HIV—including sex and sharing equipment to inject drugs—and many HIV-positive people have one or both of these viruses, known as coinfection. All people living with HIV should be screened for hepatitis B and C. Studies have shown that people with HIV and hepatitis B or C tend to experience more rapid liver disease progression and more severe complications.

Hepatitis A is not transmitted in the same ways as HIV, but outbreaks have been reported among groups with high HIV rates, including homeless people and people who inject drugs. Some studies suggest that people with HIV might take longer to fully recover from hepatitis A. The Centers for Disease Control and Prevention (CDC) recommends that all people living with HIV, as well as those who are at risk for HIV via sexual transmission or drug use, should be vaccinated against hepatitis A and B.

Studies have shown that people with HIV have a higher rate of alcohol use disorders than the general population, and this can lead to alcoholic liver disease.

Fatty liver disease (NAFLD and NASH) is common among HIV-negative people, affecting around a third of the general population. But people living with HIV appear to be at even high risk. Now that

hepatitis C can be readily cured, fatty liver disease has become a leading cause of advanced liver disease in HIV-positive and HIV-negative people alike.

What is hepatitis A?

Hepatitis A is caused by the hepatitis A virus (HAV). The virus is usually spread when someone ingests contaminated food or water.

Hepatitis A is an acute form of hepatitis, meaning that it does not cause long-term or chronic infection. Its symptoms, which it shares with other types of liver disease, are described above.

Hepatitis A is diagnosed using blood tests that look for antibodies to the virus. Two types of antibodies are measured. People who test negative for both IgM and IgG antibodies probably have never been infected and should consider getting the HAV vaccine. Those who test positive for IgM antibodies but negative for IgG likely have a recent or ongoing infection. Those who test negative for IgM but positive for IgG either were infected in the past or have been vaccinated against hepatitis A; in either case, they are now immune.

How is hepatitis A transmitted and prevented?

HAV is spread via the “fecal-oral route,” meaning when the feces from someone with the virus gets into another person’s mouth. Transmission routes include drinking contaminated water (or using ice made from such water), eating fresh fruits and vegetables that have not been properly cleaned, eating raw or undercooked shellfish, oral-anal sex (rimming) and close contact—for example, living in the same household—with a person who has the virus.

Vaccination is the best way to prevent hepatitis A. There are two vaccines available for HAV alone (Havrix and Vaqta), as well as a combination vaccine for hepatitis A and B (Twinrix). Havrix and Vaqta require two injections given at least six months apart. Twinrix is usually given in three doses. Side effects, including soreness at the injection site and flu-like symptoms, are mostly mild.

The CDC recommends routine HAV vaccination for all children and adolescents (through age 18), for adults who are at risk of infection or more severe liver disease and for anyone who want to be protected. At-risk adults include:

- People experiencing homelessness
- People who use injected or noninjected recreational or street drugs
- Men who have sex with men
- People living with HIV
- People with chronic liver disease, including hepatitis B or C or fatty liver disease
- People undergoing kidney dialysis
- Recipients of organ or bone marrow transplants

- People over age 40 (who are at higher risk for severe hepatitis A)
- People who have an occupational risk for hepatitis A
- International travelers visiting countries with medium or high hepatitis A rates
- People in close contact with individuals who have HAV, such as household members, sex partners and caregivers.

People who have recently been exposed to hepatitis A may receive post-exposure prophylaxis using the HAV vaccine and in some cases immune globulin (injected antibodies). This should be done as soon as possible after exposure.

Other prevention measures include avoiding water that could be contaminated with fecal matter, avoiding raw or undercooked seafood, using a latex barrier (such as a dental dam) for oral-anal sex, and washing your hands with soap and water after using the bathroom or changing a diaper and before preparing or eating food.

How is hepatitis A treated?

Hepatitis A usually resolves on its own without treatment but in some cases it can cause severe and even fatal illness (known as fulminant hepatitis). This is more likely if someone already has another type of liver disease, is immunocompromised or is taking medications that can harm the liver.

There are no specific treatments for hepatitis A. The usual care is bed rest. It is also important to drink plenty of fluids, particularly if you are vomiting or have diarrhea. Over-the-counter medications may help manage some of the symptoms.

Full recovery can take eight weeks or more, and some studies suggest symptoms may last longer in people with HIV. People who have had hepatitis A once cannot be infected with the virus again (but they can still get hepatitis B or C).

To learn more about hepatitis A, visit [hepmag.com](http://hepmag.com).

What is hepatitis B?

Hepatitis B is caused by the hepatitis B virus (HBV). It is most commonly transmitted through direct blood-to-blood contact, but in many cases people have no apparent risk factors.

Around 90% of adults clear HBV spontaneously without treatment, but the rest develop chronic hepatitis, meaning the infection lasts longer than six months. Among children, the proportions are reversed and most develop chronic infection. The symptoms of hepatitis B, which it shares with other types of liver disease, are described above. Many people, however, never experience symptoms.

In people with chronic infection, HBV integrates itself into the genome of cells, which makes it difficult to eradicate—though, unlike HIV, it is sometimes cured with standard treatment. Long-term HBV infection triggers inflammation, which over years or decades can lead to serious complications including cirrhosis and liver cancer.

Hepatitis B is diagnosed using blood tests that look for viral proteins (antigens) and antibodies to the virus. People who test negative for hepatitis B surface antigen (HBsAg) and HBV antibodies were likely never infected and should consider getting the HBV vaccine. Those who test positive for HBsAg and two types of antibodies likely have recent, active infection. Those who are negative for HBsAg and both types of antibodies are likely immune due to a past infection. Finally, those who test negative for HBsAg and HBV core antibodies (known as anti-HBc) but positive for HBV surface antibodies (anti-HBs) are likely immune thanks to vaccination.

How is hepatitis B transmitted and prevented?

HBV is a blood-borne virus that is spread via blood-to-blood contact. Transmission routes include sharing needles and other equipment for injecting drugs, sexual contact and vertical transmission from mother to child during gestation or delivery. While these routes are shared with HIV, HBV is easier to transmit.

Vaccination is the best way to prevent hepatitis B. Infection rates have declined dramatically in the United States since the introduction of routine childhood vaccination in the early 1990s.

There are three vaccines available for HBV alone (Engerix-B, Recombivax HB and Heplisav-B), as well as a combination vaccine for hepatitis A and B (Twinrix). Engerix-B, Recombivax HB and Twinrix usually require three doses over the course of six months, while Heplisav-B—which is only approved for adults—requires just two doses given a month apart. Side effects, including soreness at the injection site and flu-like symptoms, are mostly mild.

The CDC recommends routine HBV vaccination for all infants soon after birth, with the first follow-up dose at one month and another dose six months later. The vaccine is also recommended for children and adolescents (up at age 18) who have not yet been vaccinated and for adults who are at risk or who want to be protected regardless of risk factors. At-risk adults include:

- People whose sex partners have hepatitis B
- Sexually active people who are not in a long-term monogamous relationship
- Men who have sex with men
- People seeking testing or treatment for a sexually transmitted infection
- Survivors of sexual assault or abuse
- People who share needles or other equipment for injecting drugs
- People living with HIV

- People with chronic liver disease, including hepatitis C
- People with diabetes
- People with kidney disease
- People in correctional facilities
- People who have an occupational risk for hepatitis B
- Travelers visiting regions with high rates of hepatitis B
- People who share a household with someone who has HBV.

People who were recently exposed to hepatitis B may receive post-exposure prophylaxis using the HBV vaccine and injected antibodies, or immune globulin (HBIG). This should be done as soon as possible after exposure. This approach can also prevent mother-to-child HBV transmission.

Other prevention measures include using sterile supplies for injecting drugs (which can be obtained from a syringe exchange service); using only sterile needles for body piercing, tattooing or acupuncture; not sharing personal items such as razors or toothbrushes; and using latex barriers during sex.

How is hepatitis B treated?

In around 90% of adults, hepatitis B will resolve without treatment. Supportive care for acute HBV infection includes bed rest, drinking plenty of fluids and over-the-counter medications to manage symptoms.

Chronic hepatitis B can be treated with nucleoside/nucleotide analogue antiviral medications. These include:

- Viread (tenofovir disoproxil fumarate or TDF)
- Vemlidy (tenofovir alafenamide or TAF)
- Epivir (lamuvidine or 3TC)
- Baraclude (entecavir)
- Hepsera (adefovir)
- Tyzeka (telbivudine).

Antivirals can often bring HBV DNA viral load down to an undetectable level and return liver enzyme levels to normal. In most people, the presence of the hepatitis B 'e' antigen (HBeAg) is a sign that the virus is actively replicating. But due to a viral mutation, some people with active replication still test negative for this protein. In general, HBeAg-negative hepatitis B responds better to antiviral treatment than HBeAg-positive disease.

In some cases, antiviral treatment alone is enough to clear HBeAg and HBsAg antigens in the blood and lead to HBe and HBs antibody seroconversion—considered a functional cure. But this is rare. In one major study of Viread, although three-quarters of participants achieved an undetectable viral load, just 3% experienced HBsAg loss and only 1% had HBs antibody seroconversion. Studies have shown that adding pegylated interferon alfa (Pegasys or Peg-Intron) to antivirals increases the likelihood of a cure, but it is still uncommon.

Numerous experimental therapies are being studied in an effort to increase functional cure rates. These include drugs that attack HBV at different stages of its lifecycle. To learn about clinical trials of new treatments for hepatitis B, visit [ClinicalTrials.gov](https://clinicaltrials.gov), call the toll-free number at 1-800-HIV-0440 (1-800-448-0440) or email [contactus@aidsinfo.nih.gov](mailto:contactus@aidsinfo.nih.gov).

How is hepatitis B different for people with HIV?

While more than 90% of HIV-negative adults clear HBV without treatment, more people with HIV—perhaps 25%—will develop chronic infection. Inactive HBV may reactivate if immune function declines, for example, if a person stops taking or does not adhere to their antiretroviral treatment.

The impact of HIV on the severity of chronic hepatitis B is not well understood. Some studies have found that people with both viruses, known as HIV/HBV coinfection, tend to have more severe liver disease and that it progresses faster.

The antiretroviral medications Viread, Vemlidy and Epivir are used to treat HIV as well as hepatitis B. The HIV medication Emtriva (emtricitabine or FTC) and the combination pills Truvada (TDF/emtricitabine), Descovy (TAF/emtricitabine), and Cimduo and Temixys (TDF/lamivudine) are also active against HBV, but they are not approved for this indication.

Treatment guidelines recommend that people with HIV/HBV coinfection should include two drugs that are active against HBV—typically either TDF or TAF plus either lamivudine or emtricitabine—in their antiretroviral regimen. Stopping or switching these meds can lead to flare-ups of liver inflammation. People with HIV/HBV coinfection can be successfully treated for both viruses, but adjustments may be needed to avoid drug interactions. It is important for people with HIV and HBV to work with a provider who has experience managing both conditions.

To learn more about hepatitis B, visit [hepmag.com](https://hepmag.com).

What is hepatitis C?

Hepatitis C is caused by the hepatitis C virus (HCV). It is most commonly transmitted through direct blood-to-blood contact, for example, sharing needles to inject drugs.

About a quarter of people clear HCV spontaneously without treatment while the rest develop chronic hepatitis, meaning the infection lasts longer than six months. The symptoms of hepatitis C, which it shares with other types of liver disease, are described above. Many people, however, experience no symptoms. Over years or decades, long-term HCV infection can lead to serious complications including cirrhosis and liver cancer. Hepatitis C is one of the leading reasons for liver

transplants in the United States.

Hepatitis C is diagnosed using blood tests that look for viral genetic material or antibodies. The U.S. Preventive Services Task Force now recommends that all adults ages 18 to 79 should be screened for HCV at least once, regardless of risk factors.

The presence of antibodies shows that a person was infected with HCV in the past. But having HCV antibodies does not confer immunity, and people can be reinfected after clearing the virus spontaneously or with treatment. The presence of HCV RNA indicates current, active infection.

If a person tests positive for HCV RNA, a second test may be done to determine the viral genotype. HCV has six major genotypes, which are distributed differently around the world. Genotype 1 is most common in the United States; genotype 3 is considered hardest to treat. Genotypic testing may be done to guide decisions about treatment, but this is less important now that new antiviral drugs can cure all HCV genotypes. In contrast with HIV, viral load testing does not play a major role in hepatitis C disease progression or management.

How is hepatitis C transmitted and prevented?

HCV is a blood-borne virus that is spread via blood-to-blood contact. Transmission routes include sharing needles and other equipment for injecting drugs, sexual contact and vertical transmission from mother to child during gestation or delivery.

Outbreaks of sexually transmitted are seen most often among men who have sex with men, especially those who are HIV positive. Risk factors include anal sex, fisting, group sex, sharing sex toys, having other sexually transmitted infections and using drugs during sex. Sexual transmission of HCV among heterosexuals is uncommon.

Unlike hepatitis A and B, there is no vaccine for hepatitis C. Research is underway, but developing a vaccine has proven difficult because HCV mutates rapidly and infection does not confer natural immunity.

Hepatitis C prevention measures include using sterile supplies for injecting drugs (which can be obtained from a syringe exchange service) and using only sterile needles for body piercing, tattooing or acupuncture. Some experts think using latex barriers during sex might help prevent HCV transmission.

How is hepatitis C treated?

Supportive care for acute HCV infection includes bed rest, drinking plenty of fluids and over-the-counter medications to manage symptoms. Studies have shown that direct-acting antiviral drugs (DAAs) are highly effective during acute hepatitis C, but because many people have no symptoms, it can be difficult to diagnose HCV at this early stage.

The advent DAAs has revolutionized the treatment of chronic hepatitis C. Before 2011, standard treatment involved weekly injections of pegylated interferon plus ribavirin, usually taken for six

months to a year, depending on HCV genotype. The combination caused numerous side effects, ranging from flu-like symptoms to depression to anemia, and it only cured the disease about half the time.

The first DAAs, the HCV protease inhibitors Victrelis (boceprevir) and Incivek (telaprevir), were approved in 2011. But these drugs, which were used in combination with pegylated interferon and ribavirin, added new side effects and only modestly improved cured rates.

Modern DAAs are well-tolerated oral medications. They do not require pegylated interferon and are only rarely used with ribavirin. The newest DAAs are pangenotypic, meaning they work against all HCV genotypes. Cure rates are high, generally upwards of 90% or 95%.

DAAs include HCV protease inhibitors, NS5B polymerase inhibitors and NS5A inhibitors. Several coformulations combine two or more drugs to create a complete regimen, some of which require only a single daily pill. DAAs and combination pills include:

- Sovaldi (sofosbuvir)
- Harvoni (sofosbuvir/ledipasvir)
- Epclusa (sofosbuvir/velpatasvir)
- Vosevi (sofosbuvir/velpatasvir/voxilaprevir)
- Mavyret (glecaprevir/pibrentasvir)
- Viekira (paritaprevir/ombitasvir/dasabuvir)
- Technivie (paritaprevir/ombitasvir)
- Zepatier (grazoprevir/elbasvir)
- Daklinza (daclatasvir)
- Olysio (simeprevir)

Epclusa, Vosevi and Mavyret are pangenotypic regimens. The rest are approved for specific HCV genotypes. In most cases, treatment lasts for eight or 12 weeks. People with liver cirrhosis and those with drug resistance (for example, due to prior unsuccessful treatment) may need more medications or longer treatment. [Click here](#) to see the American Association for the Study of Liver Diseases (AASLD) hepatitis C treatment guidelines.

The goal of hepatitis C treatment is to bring HCV viral load down to an undetectable level. Sustained virological response, meaning continued undetectable HCV RNA 12 weeks after finishing treatment (known as SVR12), is considered a cure.

Successful treatment halts fibrosis progression and may lead to fibrosis regression and improvement in liver function. In some cases, people awaiting liver transplants have improved

enough to come off the waiting list. But if liver disease has already progressed to cirrhosis, the damage may not be fully reversible. This is why it is important to start treatment at an early stage. Being cured of hepatitis C reduces the likelihood of developing liver cancer, but it does not eliminate the risk.

How is hepatitis C different for people with HIV?

Because they are transmitted in some of the same ways, many people have both HIV and HCV, known as coinfection. It is estimated that around 25% of all people with HIV in the United States also have hepatitis C, rising to around 75% for those who acquired HIV via injection drug use.

Sexual transmission of HCV appears to occur more often if a person is HIV-positive; this is seen most often among men who have sex with men. HIV-positive women are also more likely than HIV-negative women to transmit HCV to their babies.

People with HIV are more likely than HIV-negative people to develop chronic hepatitis C. Several studies have shown that people with both viruses tend to have more severe liver disease and that it progresses faster. However, much of this research was done before the advent of effective antiretroviral therapy and modern hepatitis C treatment, and people with well-controlled HIV may fare no worse than HIV-negative people.

People with HIV respond as well as HIV-negative people to DAA treatment for hepatitis C. People with HIV/HCV coinfection can be successfully treated for both viruses, but adjustments may be needed to avoid drug interactions. It is important for people with HIV and HCV to work with a provider who has experience managing both conditions.

To learn more about hepatitis C, visit [hepmag.com](http://hepmag.com).

What is hepatitis D?

Hepatitis D, or hepatitis delta virus (HDV) is a small, defective virus that can only reproduce in the presence of HBV. Coinfection with both HBV and HDV typically leads to more rapid and severe liver disease progression. People who acquire HDV in addition to HBV may develop cirrhosis a decade or more earlier than those with HBV alone. There is one medication for hepatitis D, Hepcludex (bulevirtide).

What is fatty liver disease?

Fatty liver is responsible for a growing proportion of advanced liver disease. When it occurs in people who do not drink much, the condition is known as non-alcoholic fatty liver disease (NAFLD) or its more severe form, non-alcoholic steatohepatitis (NASH). People who drink heavily may develop alcoholic fatty liver disease.

Experts estimate that up to a third of Americans have fatty liver disease, and the proportion is rising along with the rate of obesity. The condition is also becoming more common among children and adolescents. Although often linked to overweight or obesity, it can also occur in lean

individuals.

Fatty liver disease is increasingly recognized as part of the metabolic syndrome, a cluster of conditions that raise the risk of cardiovascular disease, including elevated blood sugar and abnormal blood lipid levels, high blood pressure and excess fat around the waist. In fact, some experts have started calling it metabolic-associated fatty liver disease, or MAFLD.

The buildup of fat in the liver (known as hepatic steatosis) triggers inflammation, which over time can lead to serious complications, including liver fibrosis, cirrhosis and liver cancer. Fatty liver disease is now a leading reason for liver transplants in the United States.

There are currently no simple tests for fatty liver disease. Blood tests may show elevated liver enzyme levels and other biomarkers associated with metabolic abnormalities. Ultrasound, MRI or CT scans may be used to reveal fat in the liver, while transient elastography can help determine the degree of fibrosis. A liver biopsy is the most accurate way to diagnose liver inflammation, fibrosis and NAFLD/NASH. Biopsies may reveal liver cells “ballooning” as they fill with fat.

With no effective medical therapies currently approved for NAFLD or NASH, management relies on lifestyle changes. These include eating a healthy diet, getting enough exercise and losing weight, if needed. Even a small amount of weight loss—as little as 5%—can lead to improvement. But weight loss is difficult to achieve and maintain, and some research shows that people with NAFLD may have more trouble losing weight than others.

Extensive research is underway to develop medications to treat NAFLD and NASH. Fat and glucose metabolism and the development of fibrosis are complex, and scientists are trying a variety of approaches targeting different steps in the process. But progress has been slow. Several experimental drugs that produced favorable biomarker changes in early studies failed to significantly improve fibrosis in larger clinical trials. Many experts think that a combination approach will be needed to successfully manage fatty liver disease.

To learn about clinical trials of new treatments for fatty liver disease, visit [ClinicalTrials.gov](https://clinicaltrials.gov), call the toll-free number at 1-800-HIV-0440 (1-800-448-0440) or email [contactus@aidsinfo.nih.gov](mailto:contactus@aidsinfo.nih.gov).

What can I do to protect my liver?

People with all types of liver problems—whether they are HIV-positive or HIV-negative—can take steps to improve their liver health.

- Limit alcohol consumption: Guidelines recommend that men should have no more than two drinks a day and women should have no more than one drink. But many experts think this is still too much and recommend that people with liver disease do not consume alcohol at all.
- Eat a healthy diet: The liver processes everything you eat and drink, and a well-balanced diet

plays an important role in liver health. A healthy diet includes lots of fruits and vegetables and whole grains. Experts recommend limiting consumption of red meat, processed foods and unhealthy fats. Be wary of specific foods including raw or undercooked shellfish and foods high in iron.

- **Drink coffee:** Numerous studies have shown that drinking coffee may lower the risk of liver problems.
- **Maintain a healthy weight:** Losing weight, if needed, and staying at a healthy weight can improve your overall health, reduce inflammation and lower the risk of fatty liver disease.
- **Manage metabolic problems:** Follow medical advice for keeping blood sugar and cholesterol levels in check and managing diabetes or high blood pressure. If lifestyle changes don't do the trick, medications may help.
- **Get plenty of exercise:** Experts generally recommend getting at least 150 minutes of moderate aerobic activity or 75 minutes of vigorous aerobic activity each week. This can include everyday activities such as walking the dog and gardening.
- **Stop smoking:** Smoking is detrimental to your overall health, studies have shown that it increases the risk of liver cancer. Ask your health care provider for advice about quitting.
- **Limit recreational drug use:** Use of recreational or street drugs can be harmful to your health. Ask your health care provider for help—for example, medication-assisted addiction treatment—if you want to cut down or quit. If you continue to inject drugs, use a clean needle and other supplies every time, which you can get from a syringe exchange service.
- **Be careful with medications, herbs and supplements:** Some drugs, such as acetaminophen (Tylenol) can cause liver damage, especially at high doses or when combined with alcohol. Certain vitamins, nutritional supplements and herbal remedies can also harm the liver. On the other hand, other herbs, such as milk thistle, may be beneficial. Tell your doctor about all prescription and over-the-counter medications, supplements and herbs you are taking.
- **Avoid environmental toxins:** As much as possible, avoid exposure to toxic liquids and fumes, including solvents, paint thinners, and pesticides. If you must use these chemicals, work in a well-ventilated area, cover your skin and wear gloves and a protective face mask.

- Get vaccinated against hepatitis A and B: Vaccination is especially important if you have preexisting liver disease.
- Get regular medical care: Regular medical monitoring is important for people with liver disease. A number of different types of tests can be done to show whether liver damage is progressing. People with cirrhosis should be monitored regularly for liver cancer.

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